

PARTIAL POISONING of Overcrowded Fish Ponds

The ultimate fate of many farm ponds is an overcrowded bluegill population that has few bass present. This is a classical condition that results when largemouth bass populations are overfished. As numbers of bass decline, the bluegills and other sunfish continue to reproduce; consequently, there are so many small sunfish that largemouth bass cannot successfully reproduce. Each time a pair of bass spawns, the male is left to guard the nest from predators. The high numbers of small sunfish in a crowded pond pose an impossible task for the male bass to defend its nest. The result is high or total mortality of the bass offspring.

After one or more seasons of inadequate reproduction by the bass, the resultant fish population is undesirable to fishermen, and corrective measures must be taken. In many instances, a complete fish kill and restocking are necessary. In some cases, however, a partial kill of the bream to reduce their numbers and release predation pressure on spawning bass can help restructure the fish population. The recommended procedure is a shoreline or **marginal poisoning**.

A second common problem in lakes and ponds is the presence of many large shad, especially gizzard shad, which can exceed 12 inches. Shad, when they are small, provide excellent forage for bass, but often shad grow too large for most of the bass to effectively use them as a food source. At that point, shad become undesirable, because they compete heavily with bluegills and can also have adverse effects on spawning success of desirable fish.

Threadfin shad do not grow larger than about 6 inches and are acceptable as forage fish for bass. To alleviate gizzard shad problems, **selective partial poisoning** is sometimes recommended. This technique capitalizes on the different tolerances to rotenone exhibited by shad and desirable gamefish. Because shad are more susceptible to rotenone, you can apply low concentrations in a lake or pond to selectively remove shad without harming bluegills or bass. With the danger of overdosing and killing the wrong fish, undertake these procedures only with the advice and assistance of a competent fisheries biologist.

What To Use

Rotenone, a derivative of the derris plant, is the only approved toxicant for use in fish ponds. A liquid formulation is best and most convenient to use. Powdered formulations are available but difficult to dissolve in water and are not as efficient as the liquid. This material is available in a 5-percent solution from most agricultural supply stores. A

private-pesticide-applicator certificate is required to buy rotenone. You can get a private-applicator certificate by contacting your county Extension agent.

How Much To Use

Marginal Poisoning—In most cases, use 1 to 2 pints of 5-percent liquid emulsifiable rotenone per 300 linear feet of shoreline. In small ponds, the lower rate is sufficient. In larger ponds and lakes, or where bullheads, bowfin, gar, or other rough fish are present, use 2 pints per 300 linear feet.

An alternative, more precise method is to use one-eighth of the amount of rotenone required to kill all fish in the pond. This method requires knowledge of the pond's water volume. Extension Information Sheet 673, "Common Calculations Used in Fish Pond and Lake Management," provides information and formulas to calculate treatment levels.

One gallon of 5-percent rotenone will treat 1 acre-foot of water at a rate of 3 parts per million (ppm). To determine water volume, multiply surface acreage times average depth. For example, a 2-acre pond with an average depth of 5 feet contains 10 acre-feet of water. A complete kill would require 10 gallons of rotenone to reach 3 ppm. A marginal poisoning would require only 1.25 gallons of rotenone (10 divided by 8 = 1.25). With this method, apply half the rotenone to one-half of the shoreline area and then wait 2 days. Apply the other half of the rotenone to the remaining shoreline.

Selective Kill—The target concentration of rotenone for selective kill is 0.10 (1/10) ppm. To determine the amount of rotenone required, first calculate the pond volume using the previous example. Using the equation in Extension Information Sheet 673, the amount of chemical needed can be calculated by: amount = volume x conversion factor x ppm desired. Using the previous pond example where the pond is 2 acres with an average depth of 5 feet, the amount of rotenone required for a selective kill is 10 acre-feet x 0.3333 gal/acre-foot x 0.10 = 0.33 gallons.

Time of Year

Timing is critical to the success of partial poisoning of overcrowded fish ponds. For a marginal poisoning, make applications in early fall, when water temperatures have fallen below the desired spawning temperatures for bluegills. It is important the poisoning be done after bluegills have finished spawning for the season. With such

timing, it is possible to eliminate large numbers of small bluegills that previously raided bass nests. Because bass spawn in the early spring, before bluegills, the bass will be able to spawn the following spring with freedom from the marauding bands of small bluegills. Successful bass spawns are consequently more likely, and the balance of the bass:bluegill population has a greater likelihood of restoration. In north Mississippi, this should be done in late September or early October; in south Mississippi, early to late October. For a selective poisoning, apply poison in late spring, preferably April to early June, before water temperatures reach high levels but after shad have spawned.

Time of Day

Apply poison during the late-morning hours on a sunny day, preferably following one or more previous sunny days. Water temperature at this time is near its peak, and a minimum number of larger fish, especially bass, are in the shallow water. This minimizes potential loss of desirable bass. For marginal poisoning, do not poison during windy conditions, because this results in rotenone's being moved through turbulence to deeper areas of the pond. However, turbulence is desirable when making application for a selective shad kill, because it helps mix the rotenone uniformly across the water.

Application of Rotenone

Marginal Treatment—Mix rotenone with water at the rate of 1 to 3 parts water to 1 part rotenone. Apply this solution in one continuous line 10 to 30 feet from, and parallel to, the bank. Apply with a sprayer or by dripping the solution over the side of a boat. All fish between the application line and the bank will be killed. The poison settles downward through the water column and diffuses slowly to each side of the application line. Most of the fish on the outside of the application line move away from the poison into deeper water where there is no rotenone. Fish between the line and the bank will not try to swim through the rotenone, thus becoming trapped and killed. Larger fish can be killed if trapped within the application line, but application during the warm part of a sunny day minimizes this chance. Reapplication may be necessary in 1 to 2 weeks if sufficient numbers of small bluegills are not killed the first time, especially if the bluegills are extremely crowded.

Selective Shad Kill—Mix rotenone with water at a 10:1 water to rotenone ratio. It is critical to get an even distribution of rotenone throughout the water column. Take care when applying the material, and apply the rotenone in increments, gradually building to the target concentration of 0.10 ppm. If it takes 2 or 3 hours to get the chemical evenly distributed, don't worry; you want to avoid any "hot spots" that may kill bass or bream.

Remember—It is critical you accurately determine water volume and apply the proper amount of rotenone to avoid killing desirable fish. You also need to know this is not a guaranteed procedure, and local environmental variables may affect the toxicity of the chemical to fish. For that reason, start with about 1/4 to 1/3 of the required amount and thoroughly mix the water. Then, if no shad are surfacing, add the next increment in progressive fashion until the 0.10 ppm level is reached. Do not exceed 0.10 ppm.

Postapplication Check

Selective shad kill results are obvious immediately. With marginal poisoning, dead bream also are obvious, but the success of the procedure is determined by the response of the bass population in the following spring.

Monitor the fish population during the early spring, following fall application, to determine if largemouth bass successfully spawned. If successful spawns are found, a follow-up partial poisoning in the ensuing fall likely will be required to provide one more strong spawn to stabilize the population. However, if bass do not successfully spawn, stock fingerlings in May or early June at the rate of 500 bass fingerlings per acre.

Precautions

Rotenone is shown to be nontoxic to humans and most other mammals. It may, however, adversely affect pigs and should not be applied to waters where swine have access. Fish-eating birds such as ducks and geese may be affected if they eat large quantities of rotenone-killed fish, but this is an unlikely situation. There is no evidence that rotenone affects pets or domestic livestock, other than swine, or pets, when handled and applied at recommended rates. Take care to ensure that no rotenone is released into external waters such as creeks, rivers, or drainage ditches. **Read and follow all label directions.**

www.ext.msstate.edu

By **Dr. Martin W. Brunson**, Extension Leader and Fisheries Specialist.

Mississippi State University does not discriminate on the basis of race, color, religion, national origin, sex, age, disability, or veteran status.

Information Sheet 1479

Extension Service of Mississippi State University, cooperating with U.S. Department of Agriculture. Published in furtherance of Acts of Congress, May 8 and June 30, 1914, RONALD A. BROWN, Director (rev-250-4-00)